







DEPRESSIVE SYMPTOMS AND FUNCTIONALITY IN OLDER ADULTS OF THE PORTO ALEGRE'S PRIMARY CARE

Sintomas depressivos e funcionalidade em idosos da atenção primária de Porto Alegre (RS)

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ABSTRACT

OBJECTIVE: The aim of this study was to determine the prevalence of depressive symptoms (DS) and their relationship with functional, sociodemographic and anthropometric aspects in the older adults from the Family Health Strategy of Porto Alegre/RS. **METHOD:** This is a cross-sectional, prospective and analytical study, with a random sample of 509 older adults from 30 public health units. The following variables were analyzed: age, age group, sex, marital status, schooling, weight, height and body mass index, functionality, activities of daily living, both basic and instrumental, and the presence of DS. For the statistical analyses, the bivariate chi-square test and the multivariate logistic regression were used. **RESULTS:** The prevalence of DS in this sample was 35,5%. The final model presented a significant statistical association of DS with female gender (OR = 2.87; IC95% 19.2-9.23), illiteracy (OR = 2.13; IC95% 1.89-5.12), low schooling (OR = 1.23; IC95% 1.05-2.74), dependence on IADL (OR = 4.03; IC95% 1.68-9.64), low scores in the sit-to-stand test (OR = 0.89; IC95% 0.82-0.96) and lower HGS (OR = 0.95; IC95% 0.93-0.98). **CONCLUSION:** The prevalence of DS observed was high (35.4%) and, considering the associations presented, it is suggested that illiterate or poorly educated, weaker and slower women with difficulty in IADL should be investigated for the presence of depressive symptoms, for being at the risk of developing them.

KEYWORDS: aged; walking speed; muscle strength; activities of daily living; Family Health Strategy.

RESUMO

OBJETIVO: Determinar a prevalência de sintomas depressivos (SD) e a sua relação com aspectos funcionais, sociodemográficos e antropométricos em idosos da Estratégia Saúde da Família de Porto Alegre (RS). **MÉTODOS:** Trata-se de um estudo transversal prospectivo e analítico com amostra aleatória de 509 idosos de 30 unidades básicas de saúde. Analisaram-se idade, faixa etária, sexo, estado civil, escolaridade, peso, altura, índice de massa corporal, funcionalidade, atividades básicas e instrumentais de vida diária e presença de SD. Para análise estatística, utilizou-se o teste χ^2 (bivariada) e de regressão logística (multivariada). **RESULTADOS:** A prevalência de SD na amostra foi de 35,4%. O modelo final apresentou associação estatisticamente significativa de SD com sexo feminino (odds ratio — OR = 2,87; intervalo de confiança de 95% — IC95% 1,92-9,23), analfabetismo [(OR = 2,13; IC95% 1,89-5,12), baixa escolaridade (OR = 1,23; IC95% 1,05-2,74), dependência em atividades instrumentais de vida diária (OR = 4,03; IC95% 1,68-9,64), baixos escores no teste senta/levanta (OR = 0,89; IC95% 0,82-0,96) e menor força de preensão manual (OR = 0,95; IC95% 0,93-0,98). **CONCLUSÃO:** A prevalência dos SD observada foi alta, e, ante as associações apresentadas, sugere-se que mulheres analfabetas ou com baixa escolaridade, com dificuldade em atividades instrumentais de vida diária, mais fracas e lentas devem ser investigadas quanto à presença de SD, pelo risco de desenvolvê-los.

PALAVRAS-CHAVE: idoso; velocidade de caminhada; força muscular; atividades cotidianas; Estratégia Saúde da Família.

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INTRODUCTION

The rapid demographic growth of people aged 60 years and over has been the subject of studies in Brazil and around the world, largely due to the high financial impact on social and public health policies, which require adjustments to provide adequate care for this population.^{1,2}

In addition to the accelerated growth of the older population in the country, it is necessary to consider that 6.8% of them report difficulties in performing some activities of daily living without assistance.³ In this setting, there is a need for health policies and strategies to improve autonomy and quality of life in older adults, as biological aging can bring about cognitive and motor changes that sometimes make this population dependent and modify their lifestyle.^{4,5} The cognitive and functional disability in aging adults can be reflected in psychological distress and decreased social participation.^{6,7} In this context, depression is the most important causative agent of reduced quality of life in older people in emerging countries.⁸ Additionally, it is the second most important factor that impairs functional capacity in older adults in developed countries,⁸ representing a significant public health problem in Brazil, where the prevalence in the older population ranges from 4.7 to 36.8%.⁵

In this clinical and epidemiological context, the present study was developed to determine the relationship between depressive symptoms (DS) and functional, sociodemographic, and anthropometric aspects in older adults attending the Family Health Strategy (FHS) in Porto Alegre, state of Rio Grande do Sul.

METHODS

From March 2011 to December 2012, a study called ‘The multidimensional study of the older people in the Family Health Strategy in Porto Alegre, Brazil (EMI-SUS)’ was developed, with a cross-sectional and analytical design. The investigation involved 30 FHS teams, randomly selected from each health district, around 30% from each district. Each FHS participating in the study provided a list of older adults registered by their teams. Then, 36 of them were randomly selected from each of the participating FHS teams to participate in this research.⁹ All randomization (teams and older users) was performed by random number tables generated in the Excel software.

Sample

A total of 587 older adults were evaluated in 2 stages:

- Collection of general data, including interviews conducted by community health care agents in the participants’ homes to obtain information on sociodemographic and clinical aspects;
- Clinical evaluation, by a multidisciplinary team at the Hospital São Lucas (HSL), of the Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS).⁹

Inclusion criteria were: age 60 years or over and active registration in the FHS. Individuals unable to go to HSL for the multiprofessional evaluation were excluded. This exclusion was minor, because the research group provided transportation for participants, who were picked up at their FHS units or at their dwellings, if they could not get there without help.

Measurement and evaluation instruments

The variables studied, their categories, the evaluation instrument used and the place of collection are shown in detail in Table 1. For the analysis of the present study, the following variables of the original sample were used: sex, age, age range, marital status, education, weight, height, body mass index (BMI),¹⁰ sit-to-stand score,¹¹ handgrip strength (HGS),¹² time (seconds) to walk 10 m,¹³ basic activities of daily living (ADLs — Katz Index),¹⁴ instrumental activities of daily life (IADLs — Pfeffer’s scale)¹⁵ and presence of DS (short version of the Geriatric Depression Scale — GDS-15).¹⁶

Statistical analysis

Data were analyzed using SPSS version 20.0 (SPSS Inc., Chicago, IL, United States), and significance was established at 5%.

The Kolmogorov-Smirnov test was used to determine the continuous variables’ distribution, while Student’s *t*-test and Mann-Whitney’s test were used in the comparison between 2 independent groups. Pearson’s χ^2 test with continuity correction or Fisher’s exact test were used in the bivariate analysis between categorical variables. To estimate the effect measure, the crude odds ratio (OR) was used, with a 95% confidence interval [CI].

For multivariate analysis, the logistic regression of the variables with *p* values <0.200 in the bivariate analysis was performed using the backward conditional method on the saturated model. The association was assessed with the likelihood-ratio test (2LL or -2log) and the quality of fit of the final logistic regression model with the Nagelkerke and Hosmer-Lemeshow R² estimators. The probability of gradual entry of the variables to the model was 0.05 and for removal, 0.10, and the cutoff point for statistical significance

was established at 0.50 for a maximum of 20 interactions. Significance levels below 0.01 were considered significant based on the Bonferroni criterion.

Ethical Considerations

Both the Research Ethics Committee of PUCRS and that of the Municipal Health Secretariat of Porto Alegre approved the project (approval certificate numbers 10/04967 and 001.021434.10.7, respectively), in compliance with the Research Regulatory Guidelines and Standards of Resolution n. 196/96 of the Brazilian National Health Council of the Ministry of Health (CNS / MS). All participants and / or their guardians were clearly informed about the objectives and methods of the research and provided written information consent, of which they received a copy.

RESULTS

The original sample included 587 people, however the data from 78 participants (13.3%) were disregarded, due to missing data in relation to the variable DS. Thus, the results refer to a sample of 509 participants (Table 2), of which 35.4% presented DS, most of them women up to 69 years, who did not live with a partner, and presented a low level of education as well as overweight/obesity.

The results regarding the associations found between DS and the sociodemographic characteristics of the sample are shown in Table 2, while Table 3 shows the results concerning functional and clinical characteristics, and Table 4 indicates the predictive factors for the occurrence of DS - both the initial (saturated) and the final (reduced) models, established in 6 stages. Due to the loss of the predictive potential

Table 1 Description of the study variables: categories, instruments used and places of collection.

Type of Variable	Variables	Categories	Data Collection	
			Instrument	Place
Sociodemographic	Age	No	Global Assessment questionnaire for the older population	Home
	Age range	60 to 69 years; 70 to 79 years; ≥ 80 years	Global Assessment questionnaire for the older population	Home
	Education level	illiterate; low; medium + high schooling	Global Assessment questionnaire for the older population	Home
	Marital status	Marital cohabitation; does not live with a partner	Global Assessment questionnaire for the older population	Home
Anthropometrical	Weight	No	Welmy scale ^a	HSL
	Height	No	Measuring Tape	HSL
	BMI	Low weight; eutrophy; overweight/obesity	Quetelet (BMI = weight/height) ²	HSL
Functional	Time to walk 10 m	No	Chronometer	HSL
	30-second sit-to-stand test (no. repetitions/30s)	No	Chronometer	HSL
	Handgrip strength (kgf)	No	Crow [®] Dynamometer	HSL
	ADLs	Independent (Katz ≥ 5); dependent (Katz ≤ 4)	Katz Index	HSL
	IADLs	Independent (Pfeffer ≤ 4); dependent (Pfeffer ≥ 5)	Pfeffer's scale	HSL
Clinical	DS	With DS (GDS-15 ≥ 5); without DS (GDS-15 < 5)	Geriatric Depression Scale - short version (GDS-15)	HSL

HSL: Hospital São Lucas at the Pontifícia Universidade Católica do Rio Grande do Sul; BMI: body mass index; ADLs: Basic Activities of Daily Living; IADLs: Instrumental Activities of Daily Living; Katz: Katz Index score; Pfeffer: Pfeffer's scale score; DS: depressive symptoms; GDS-15: score obtained on the Geriatric Depression Scale (GDS) - short version.

of certain variables, the final model consisted of 6 variables (Table 4): female sex, illiteracy, education level, dependence on IADLs, lower sit-to-stand test scores, and lower HGS.

The Hosmer-Lemeshow test indicated that there were no significant differences between the model estimates and the actual sample classifications for the presence of DS ($\chi^2 = 6.866$; $p = 0.388$). In this sense, the confusion matrix for the total number of correct answers was 64.2%, in which the model correctly classified 55.6% of the cases without DS and 72.4% of the cases that confirmed the presence of DS.

DISCUSSION

The profile of the sample — a majority of women aged 60–69 years and with low level of education — reveals that it is similar to that of the research universe, i.e., the older population in the city of Porto Alegre.¹⁷ However, there is a disagreement regarding marital coexistence, because, according to data from the Porto Alegre Municipal Plan for older adults, 26.5% of inhabitants aged 60–69 live with a partner, while in the present sample this rate was higher, 36.9%.¹⁷

Two known risk factors for the presence of DS were confirmed, female sex and illiteracy.¹⁸ Women were more likely to

Table 2 Sociodemographic characteristics of the sample, according to the presence of depressive symptoms.

Variables	Depressive Symptoms				p [‡]	Odds Ratio _{crude} (95%CI)
	Yes (n = 180)		No (n = 329)			
Sex*						
Men	45	25.0	129	39.2	0.001 [§]	1.0
Women	135	75.0	200	60.8		1.24 (1.10–1.40)
Age (years)						
Mean ± SD (Range)	68.9 ± 7.6 (60.0–100.2)		68.7 ± 6.8 (60.0–103.8)		0.749 [€]	1.04 (0.97–1.03)
Age range*						
Up to 69 years	114	63.3	210	63.8	0.873 [§]	1.0
70 – 79 years	50	27.8	94	28.6		0.98 (0.64–1.48)
80 years or over	16	8.9	25	7.6		1.18 (0.60–2.30)
Marital status*						
Marital Cohabitation	70	38.9	118	35.9	0.499 [§]	1.08 (0.85–1.38)
Does not live with a partner	110	61.1	211	64.1		1.0
Schooling*						
Illiterate	61	33.9	59	17.9	< 0.001 [§]	3.02 (1.11–7.31)
Low	109	60.6	235	71.4		1.11 (0.79–2.83)
Medium and high	10	5.6	34	10.3		1.0
Weight (kg)						
Mean ± SD (Range)	69.6 ± 14.9 (42.0–122.1)		70.7 ± 13.5 (32.5–113.3)		0.437 [*]	0.99 (0.98–1.08)
Height (m)						
Mean ± SD (Range)	1.54 ± 0.08 (1.32–1.77)		1.58 ± 0.09 (1.37–1.78)		< 0.001 [*]	0.02 (0.001–0.11)
BMI (kg/m ²)						
Mean ± SD (Range)	29.2 ± 6.1 (16.2–54.1)		28.4 ± 5.4 (16.7–48.1)		0.159 [*]	1.04 (0.99–1.06)
BMI Categories*						
Low weight	17	10.1	27	8.3	0.442 [§]	1.14 (0.59–0.21)
Eutrophy	48	28.6	110	34.0		0.79 (0.52–1.21)
Overweight/obesity	103	61.3	187	57.7		1.0

[‡]minimum level of significance for bivariate analysis; 95% CI: 95% confidence interval for odds ratio; data showed as n (%); SD: standard deviation of the mean; BMI: body mass index; [§]Pearson's χ^2 test; [€]Student's t test for independent groups assuming variance homogeneity; ^{*}Student's t test for independent groups assuming variance homogeneity; low weight: BMI < 22; eutrophy: BMI between 22 and 27; overweight/obesity: BMI > 27.

Table 3 Functional characteristics of the sample, according to the presence of depressive symptoms.

Variables	Depressive Symptoms				p ^ε	Odds Ratio _{crude} (95%CI)
	Yes (n = 180)		No (n = 329)			
Time to walk 10 m (s)						
Mean ± SD (Range)	7.3 ± 2.3 (3.0–16.0)		6.4 ± 1.8 (3.0–20.0)		< 0.001*	1.23 (1.14–1.39)
Sit-to-stand test*						
Mean ± SD (Range)	7.6 ± 2.7 (1.0–18.0)		9.3 ± 3.1 (2.0–23.0)		< 0.001*	0.81 (0.75–0.87)
Handgrip strength (Kgf)						
Mean ± SD (Range)	22.8 ± 8.9 (7.5–46.5)		27.6 ± 8.6 (5.2–21.5)		< 0.001*	0.94 (0.91–0.96)
Katz Index score (points)						
Mean ± SD (Range)	5.6 ± 0.8 (1.0–6.0)		5.8 ± 0.5 (0.0–6.0)		0.103*	0.55 (0.35–1.09)
Katz Index categories**						
Independent	164	92.1	321	97.9	0.002 [§]	1.0
Dependent	14	7.9	7	2.1		4.43 (1.56–11.03)
Pfeffer's scale (points)						
Mean ± SD (Range)	2.9 ± 4.3 (0.0–23.0)		0.9 ± 2.6 (0.0–26.0)		<0.001*	1.26 (1.15–1.37)
Pfeffer's scale categories**						
Independent	137	77.4	316	96.3	<0.001 [§]	1.0
Dependent	40	22.6	12	3.7		3.02 (1.84–4.93)

^εminimum level of significance for bivariate analysis; p: probability; 95% CI: 95% confidence interval; SD: standard deviation of the mean; *data showed as number of times in 30 s; **data showed as n (%); *Student's t test for independent groups assuming variance homogeneity; [§]Pearson's χ^2 test.

Table 4 Multivariate binary logistic regression models for predicting the presence of depressive symptoms.

Independent Variables	Regression Coefficient			Odds Ratio _{adjusted} (95%CI)
	C _{crude}	S.E.	Sig.	
Initial model**				
Women	0.597	0.377	0.012	1.49 (1.18–3.12)
Illiterate	1.093	0.457	0.029	2.09 (1.32–4.90)
Low level of education	0.807	0.415	0.037	1.74 (1.15–2.98)
Lower score for the sit-to-stand test*	-0.116	0.047	0.014	0.89 (0.81–0.98)
Lower handgrip strength	-0.051	0.021	0.016	0.95 (0.91–0.99)
Dependence in IADLs (Pfeffer's scale)	1.347	0.457	0.002	4.00 (1.18–9.79)
Final model***				
Women	1.597	0.412	0.012	2.87 (1.92–9.23)
Illiterate	1.758	0.446	0.009	2.13 (1.89–5.12)
Low level of education	0.809	0.407	0.039	1.23 (1.05–2.74)
Lower score on the sit-to-stand test*	-0.118	0.041	0.004	0.89 (0.82–0.96)
Lower handgrip strength	-0.048	0.014	< 0.001	0.95 (0.93–0.98)
Dependence in IADLs (Pfeffer's scale)	1.392	0.445	0.002	4.03 (1.68–9.64)

95% CI: 95% confidence interval; C_{crude}: crude regression coefficient; S.E.: standard error for the regression coefficient; Sig.: p = minimum significance level for the regression coefficient; * sit-to-stand test: number of repetitions in 30 s; IADLs: Instrumental Activities of Daily Living; **initial model: Nagelkerke R² = 0.354; Hosmer-Lemeshow test (χ^2 = 11.130; p = 0.633); Cox & Snell = 0.288; general rate of correct answers — confusion matrix = 55.7%; ***final model: Nagelkerke R² = 0.422; Hosmer-Lemeshow test (χ^2 = 6.866; p = 0.822); Cox & Snell = 0.388; general rate of correct answers — confusion matrix = 72.4%.

manifest DS than men, and illiteracy in the sample is compatible with municipal indices, indicating that 41.3% of the older population have little or no education. Only in 2 health districts (Restinga and Lomba do Pinheiro) the number of uneducated men was higher than women.¹⁷

Illiteracy and low level of education were important factors in older adults with DS. Illiteracy can hinder the social participation of older persons, making them lonelier and diminishing social support.¹⁹ Limitations on IADLs and restricted choice of hobbies are common characteristics of those who are totally illiterate, making them more dependent on a support network and susceptible to the diagnosis of severe depression.¹⁸

This result – association between DS and low level of education or illiteracy – is important to understand the difficulties of this population in accessing and using the health care system, as well as in understanding information from health care professionals and managing their self-care.²⁰

Participants with DS in this study also presented worse functional characteristics, such as longer time to walk 10 m, fewer repetitions in the sit-to-stand test, and poorer performance on the HGS test, indicating that functionally, the participants with DS presented decreased strength and agility.

The decrease in gait speed was another aspect found in this research that has been pointed out as a strong predictor of long-term DS in the older population. In addition, regardless of associated comorbidities, this aspect has been incorporated into the depressive syndrome due to its importance.²¹

Despite having found a significant association between lower gait speed and DS for women, a cohort study found gait speed as a predictor of depression among men,²² making the sex variable an important factor to consider in this relationship.

There may be a bidirectional character in the relationship between DS and gait speed. That is, regardless of which occurs first, a proper management of both factors is possible to prevent future suffering from both mental and functional causes.²³

Poor performance in the sit-to-stand test for lower limb strength assessment has also been associated with the presence of DS. Older men who were previously diagnosed with depression performed worse on the sit-to-stand test and the Timed Up and Go Test (TUG), 9 years after the diagnosis of depression, compared with those who never had depression.²⁴

The relationship between DS and worse sit-to-stand test scores seems to be an important factor in other

populations. In institutionalized older adults, those with lower scores in the sit-to-stand test showed higher scores in DS measurements.²⁵

Another study of older adults involving depression and functionality found that poor performance in the sit-to-stand test was a stronger predictor of depression in women, while poorer gait speed performance was a better predictor of depression in men.²⁶ This same study pointed out that, although it has a significant relationship with DS, HGS proved to be a less important predictor in this study.²⁶ Changing the values measured would not necessarily cause changes in DS, possibly due to a psychological adaptation that occurred in the aging process.²⁷

Another research with community-dwelling older people points to a significant association between HGS and depression, but this association was observed only in individuals who have concomitant decreased muscle strength (measured by dynamometry) and mobility (assessed by gait speed). This finding reinforces the hypothesis that functionality should be measured by various instruments.²⁸

In a recent systematic review, we confirmed the scarcity of studies regarding the identification of HGS as a predictor of depression. Initially, only 1 investigation seeking this association was found, however this is due to the inclusion of longitudinal studies only.²⁹

A cross-sectional study with a population similar to that in the present study found an equivalent result in the association between depression and HGS with depressed older people with lower scores compared to non-depressive ones.³⁰ However, another study makes an important caveat, indicating sarcopenia as a possible confounding factor in the relationship between HGS and depression, as it shares the same pathophysiological pathway as depression.³¹

In addition, these characteristics end up impacting other aspects of the lives of the individuals affected by them. This is the case of the worse performance also in the IADLs measured by the Pfeffer scale,³² which indicates that older people with DS who have activity limitations caused by loss of bodily functions also suffer from restrictions on their participation in real-life situations outside their homes.³³

A cohort study of US older adults investigated the association of depression with loss of ADL / IADL skills according to race and sociodemographic characteristics over an 8-year period. Results indicated positive association in both racial groups, white and black. However, white older people showed progression of depression-related ADL disabilities over time, while black older people did not.³⁴

The inability to perform ADLs was significant when associated with depression in a study with English aging adults. This relationship was also stronger in women who were older, had lower income, presented 2 or more comorbidities, and who did not live with a partner.³⁵

The results related to the association of DS with worse functional performance are frequent in older people living in the community around the world, corroborating with those found in the present study.^{36,37}

An association with frailty syndrome was also identified, as reported by Fried et al., who studied African-American women with low level of education, low income, lower functionality, more comorbidities and chronic diseases. These data suggest that older women are more susceptible to falls, with worsen performance in ADLs and IADLs, reduced mobility, and high mortality. The authors observed that these women presented DS because they fit the frailty criteria.¹²

Except for sex, all factors investigated and identified as predictors of DS are modifiable not only through drug therapy but also by simple strategies and methods, easily applicable in primary care settings, such as respect for the individual's religion and spirituality — to improve the care of those with anxiety and depression — group physical activity, psychotherapy, electronic games, among others.^{33,38-41}

The cross-sectional design of the present study (with only 1 measurement point) is a limitation, because the direction of the causal relationship between DS and risk factors cannot be determined, since this association can also be bidirectional.²³ Another point to be emphasized is that the older adults excluded from the sample were possibly much more fragile and had greater impairments in functional and cognitive capacity than those taken to the collection site. Despite these limitations, it is important to highlight the

representativeness of the investigated sample, of sufficient size for a prevalence study, selected randomly and proportionally in all health care districts of the municipality, which may have reduced the selection bias.

The data reported in the present study can be used to plan actions and strategies that favor health promotion in this population, already weakened by aging and low education, among other unfavorable aspects.

CONCLUSION

In a sample with a high prevalence of DS, despite the predominance of older people without DS, it was concluded that women with low level of education, illiterate, and with difficulty in IADLs should be investigated for the presence of DS, since they were identified as a risk group for the development of such symptoms.

CONFLICT OF INTERESTS

There is no conflict of interest to declare.

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